

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. DTG1-127US	
In re patent application of Stephen William SANKEY et al.	Group Art Unit: 1794
Serial No. 10/564,593	Examiner: Erik Kashnikow
Filed: 01/13/2006	
For: BREATHABLE POLYMERIC FILM	

DECLARATION UNDER 37 CFR § 1.132
OF STEPHEN WILLIAM SANKEY

Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Stephen William Sankey, the undersigned, a citizen of Great Britain and a resident of Great Smeaton, North Yorkshire, United Kingdom, do hereby declare that:

1. I am one of the co-inventors of the invention described in US application No. 10/564,593 (hereinafter "the present application"), and accordingly I am familiar with the content thereof.

2. I graduated as a Bachelor of Science from the University of London in 1979, and completed a Doctoral Degree from the University of Cambridge in 1982. I am employed by DuPont Teijin Films UK Limited, where I have been engaged in research and development of polyester films since 1982.

3.1 The objective is stated on page 12 of the present application as being:

"...to provide a breathable, heat-sealable packaging film which allows egress of moisture and excreted gas, particularly moisture, from the packaged product but which provides a physical barrier to insects, bacteria and airborne contaminants, particularly wherein the film is optically clear."

By the term "breathable film", I intended to refer to a film which is permeable to gases, particularly moisture vapour, and which should have a water vapour transmission rate (WVTR) of at least 60 g/m²/day.

3.2 The present invention is directed to a novel breathable composite film comprising a perforated substrate layer and an unperforated barrier layer of no more than 12 microns. The reason that the unperforated barrier layer is restricted to 12 microns is that, in our work, we found that thicknesses of greater than 12 microns do not demonstrate sufficient permeability to water vapour. As discussed in more detail below, permeability is measured by the WVTR and is determined by the identity of the polymeric layer and the thickness of that layer.

4. I have read and understood the cited art of US-4587175 (Akao; Fuji Photo Films) which has been cited against the present application. I have also read and understood the Office Action issued by the USPTO dated April 13th 2009. It is my understanding that the Examiner

considers the breathable films of the present application to be obvious over Akao.

5.1 Akao is concerned with a light-shielding packaging film for photosensitive materials. The packaging film is a laminated film (at least 3 layers) with a perforated core layer, which is adhesively laminated to the flexible outer layers such that the adhesive is applied on only one of the flexible outer layers and extends through the apertures (col.1, lines 39-47; col.8, lines 62-64). The objective of the invention is to provide a packaging film which has the following properties: low curl; high impact resistance and flexibility; heat-sealable; cushioning, flatness and slip properties; control of moisture proofness and gas barrier; reduced weight (see col.1, lines 12-30; col.8, lines 12-19; col.11, lines 3-11). At least one layer of the overall laminate is required to have a light-shielding property (col.6, lines 50-51).

5.2 The term "control of moisture proofness and gas barrier" is of particular relevance here. In my opinion, the films of Akao have a high moisture proofness and a high gas barrier, and this is immediately clear from reading the document in its totality, and in particular from:

- (i) the intended use of the film and Akao's stated objective;
- (ii) the materials and construction used to manufacture the films, particularly the exemplified films; and
- (iii) the optional components which may be present in the films.

The reasons for this are explained in more detail below. Thus, the films of Akao are intended to have properties which are the very opposite of the ones we targeted in the present application, which are required to be "breathable" (see claim 1, and page 1, lines 3-4), i.e. permeable to gaseous water and oxygen (see page 2, lines 25-28).

6.1 With regard to Akao's intended use, the films are intended to be used for the packaging of photosensitive materials (column 1, lines 5-7 and 23-24; and column 12, lines 5-8). It is important in the storage of such materials not only to shield the material from light, but also to avoid water contact. In my opinion, it is for this reason that Akao states in column 1, lines 24-26 that:

"...said photosensitive materials having so far been packaged in sealed metallic containers for transportation." [emphasis added]

Akao then proceeds to state:

"In addition, such laminate sheets are expected to offer practical advantages, e.g. be used to control moisture-proofness and gas barrier."

In my opinion, the phrases "moisture proofness" and "gas barrier", even when taken in isolation, immediately suggest to me that the inventor was inherently targeting high levels of moisture proofness and high levels of gas barrier. If the inventor had intended to target low levels of these properties, it would have been more appropriate to use the term "permeability", or similar. In any event, and regardless of my interpretation of the precise wording chosen in Akao's patent, Akao's true intention becomes clearer when one considers the previous sentence in which he states that photosensitive materials had previously been packaged in sealed metallic containers. However, the most critical information which tells me, beyond any doubt whatsoever, that Akao's films possess a high moisture proofness and a

high gas barrier, is the identity of the polymeric films disclosed in the remainder of the document. In particular, the most critical information is the identity of the polymeric materials to make the various film layers, the thickness of these film layers, and the manner in which the layers are laminated.

6.2 In order to provide the Examiner with some background information, I refer to the permeability data in Table 1 below, which presents the water vapour transmission rate (WVTR) of a 25 micron film of the stated polymer.

Table 1

Polymer identity	WVTR (g/m ² /day)
Polyethylene terephthalate (PET)	27.5
Linear low-density polyethylene (L-LDPE)	17.5
High-density polyethylene (HDPE)	5
Oriented polypropylene (OPP)	6

The data in Table 1 show that, at 25 microns, none of the polymeric films demonstrate a high permeability to water vapour. Moreover, the data further show that the polyolefin films are significantly less permeable to water when compared to PET.

6.3 Akao states a clear preference for polyolefin outer layers (see column 4, lines 14-18 and 27-32), but more importantly the exemplified films all contain a major proportion of polyolefin, as is clear from the disclosures of each "invented laminate" in Table 1 (columns 11-14), which is summarized in Table 2 below:

Table 2

Laminate	Thickness of polyolefin layer(s)
1	102 µm LDPE hot melt adhesive in total 70 µm L-LDPE fifth layer
2	86 µm LDPE hot melt adhesive in total 50 µm HDPE first layer 40 µm perforated third layer 70 µm LDPE fifth layer
3	39 µm as hot melt adhesive in total
4	112 µm LDPE hot melt adhesive in total 40 µm polypropylene first layer 50 µm perforated polypropylene layer 60 µm LDPE fifth layer
5	59 µm LDPE hot melt adhesive in total 70 µm LDPE fifth layer
6	73 µm LDPE hot melt adhesive in total 50 µm LDPE first layer 50 µm LDPE seventh layer

Given the data in Tables 1 and 2, it should be abundantly clear that the laminated films disclosed by Akao are very highly impermeable to water vapour, i.e. they show very high

"moisture proofness and gas barrier", and there is no doubt in my mind whatsoever that this is indeed the case.

6.4 I also note that one of the optional components of Akao's films is a metal layer (column 3, lines 66-67 and column 6, lines 56-62). Clearly, if Akao had even the slightest concern about providing a breathable film, he would not have proposed the use of metal layers which are highly water-impermeable. In my opinion, the disclosure of these optional components can only reinforce the idea that Akao's objective is to provide packaging films which show high "moisture proofness and gas barrier".

7. In summary, therefore, it is my opinion that the films of Akao are highly impermeable and have no relevance whatsoever to the person skilled in the art who was seeking to manufacture a "breathable" film, i.e. one which exhibits high permeability to moisture vapour, as claimed in the present application. In my opinion, this would have been immediately evident to the skilled person from the reference to "controlling moisture-proofness and gas barrier" in the context of the passage of column 1 lines 24-28, and this can only have been confirmed upon the complete reading of Akao's patent specification.

8.1 I also note the Examiner's reference to a secondary prior art reference (also Akao; US-4661401). This secondary prior art teaches in claim 1 a film which requires
(i) a foamed sheet of thickness 0.3 to 2.0 mm (300 to 2000 µm);
(ii) an unperforated L-LDPE layer having a thickness of 13 to 120 µm melt-bonded to one side of the foamed core; and
(iii) an oriented thermoplastic film having a thickness of 5 to 120 µm melt-bonded to the other side of the foamed core.

It should also be noted that the melt-bonding is achieved in all examples *via* at least two LDPE layers each of 15 microns in thickness (see Table 1 in US-4661401).

8.2 It is important to understand that there is a fundamental difference between the controlled perforations of the present invention, and the general foamed structure of US-4661601. Besides the difference in optical properties, the foamed structure typically contains closed cells whereas the idea of perforation is to generate open channels in order to allow passage of water vapour and other gases. Of course, as well as a thick core layer, US-4661401 also requires at least a 13 µm polyolefin layer, and in all examples there are at least two further LDPE layers each of 15 µm in thickness. As such, it is my opinion that US-4661601 is completely irrelevant to the skilled person seeking to produce a breathable and water-vapour permeable film, and further that the combination of Akao's disclosures in US-4587175 and US-4661401 could not possibly lead the skilled person to the production of the breathable film as claimed in the present application.

9. I further declare that all statements herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 16th June 2009

Stephen William Sankey
Stephen William Sankey